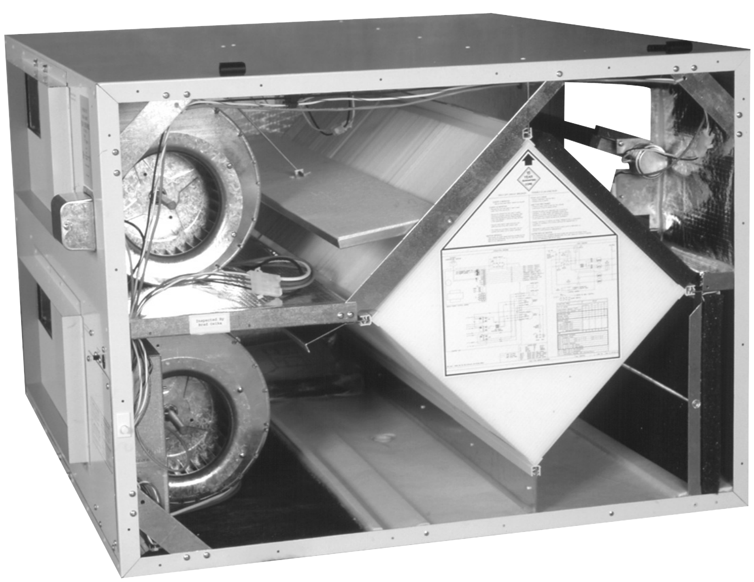
Installation, Operation and Maintenance Instructions

HRV650 • HRV700 • HRV1150



HRV1150

Table of Contents

Safety Considerations

Hazards may exist within this equipment because it contains electrical and powerful moving components. Only qualified service personnel should install or service this equipment. Untrained personnel can perform basic maintenance such as maintaining filters. Observe precautions marked in the literature and on labels attached to the unit. Follow all safety codes.

WARNING

Disconnect the main power switch to the unit before performing service or maintenance. Electric shock can cause personal injury.

Installation

Inspection

Inspect the exterior of the unit for shipping damage by ensuring that there is no damage to the door, door latches, door hinges, damper, duct collars, cabinet, etc. Inspect the interior of the unit for damage by ensuring that the fan motors and housings, heat exchanger, insulation, dampers, actuators and drain pans are all intact.

If transportation damage is found, file a claim immediately with the transportation agency. Remove all packaging, tape, etc. from the cabinet.

Mounting Location Requirements

When determining an installation location, the unit must be mounted in a heated area to prevent condensate drain lines from freezing. The mounting location should be away from occupied areas to provide quiet operation. The area should also be easily accessible for maintenance.

NOTE: These Heat Recovery Ventilators have minimum clearance requirements when mounting. See Appendix B for specific clearance requirements. Mounting options must allow 6" [152mm] clearance in front of control cover for access.

A mounting location close to an exterior partition will minimize the length of insulated duct. The unit should be close to a drain and 120 volt, 60 Hz power supply. The unit should be mounted away from hot chimneys, electrical panels and other hazards. The area should also be easily accessible for maintenance.

Mounting Options

There are several options for hanging or floor mounting the unit.

NOTE: In all cases, the unit must be level. Consult local building code for restrictions in your area regarding installation.

Hang the unit with the reinforced rubber straps provided as shown in Appendix A. Check with local building codes regarding the use of rubber straps in commercial buildings. Attach the straps to the unit with two #8 screws provided. Then attach the other end of the strap to the ceiling joists, trusses, custom frame, etc.

The unit can also be hung with 3/8" [10mm] threaded rod and U channels or angles (not supplied) as shown in Appendix A.

When installing the unit, keep in mind that access to the control panel may be required. Supply and exhaust ducts to outside may have 1" to 2" [25 to 51mm] of insulation on them. Rubber vibration isolation may be required and is recommended for quiet operation.

The unit can also be mounted on a metal or wooden curb (not supplied) bolted to the floor as shown in Appendix A. Space must be left under the unit to allow connection of drain lines. A gradual slope is required for the condensate water to drain by gravity (minimum 1/4"/foot) [6mm/305mm]. If this is not possible, a pump should be used. If attachment of the unit to the curb is required, ensure that screws, bolts and mounting hardware do not interfere with moving parts or that the integrity of the cabinet insulation is not affected.

Ductwork

The supply and exhaust duct connections on the unit are as follows:

UNIT	DUCT SIZE
600 cfm or 700 cfm	14" x 8" [356 x 203mm]
1150 cfm	20" x 8" [508 x 203mm]

NOTE: Duct sizes are for connection purposes only. Ducts should be sized to keep noise and pressure drop to a minimum.

The supply and exhaust ducts connected to outside, as well as any ducts passing through an unconditioned space, must have a minimum insulation value of R5. In addition, a continuous integral vapor barrier over the duct insulation must be used.

Air balancing dampers are recommended for both supply and exhaust ducts to allow for adjustment of airflow. Also, flexible canvas connectors should be installed close to the unit in the supply duct to the building and the exhaust duct from the building to reduce noise transmission from the unit to the building (see Appendix C).

All ports on the 600 cfm and 1200 cfm units have 1" [25mm] flanges to facilitate the installation of the ductwork. Please note that the "Fresh Air from Outside" port has a frost control damper incorporated with it. Ensure that any mechanical fasteners used to connect the duct do not interfere with the operation of the damper. **Screws can be installed on the side of the cabinet rather than the flange for this port only.** For port locations see Appendix B.

All ports on the 700 cfm unit have 2" [51mm] flanges to facilitate the installation of the ductwork. Please note the "Fresh Air From Outside" connection is factory set to be the left side upper port. It is possible to reverse the operation of the frost control damper in order to use the port on top of the cabinet for "Fresh Air From Outside" connection.

To change the "Fresh Air From Outside" from the side to the top use the following directions. For port locations see Appendix B.

Remove the cover of the damper motor with a flat screw driver. Reverse the Orange and Red wires by moving the Orange from terminal #2 to terminal #3 and moving the Red wire from terminal #3 to terminal #2. The end result, in order to have the "Fresh Air From Outside" connection to the top port, will be; #1 - White, #2 - Red, #3 - Orange.

Internal Grilles and Diffusers

Locate exhaust grilles and supply diffusers to provide effective ventilation and avoid short circuiting of airflows. Adjustable dampers should be provided at every grille and diffuser location to make balancing of the system possible.

A proper selection of style and size of grilles and diffusers is required to minimize pressure drop. The velocity of the airflow should not exceed 400 ft/min [2 m/sec] for normal applications.

The duct system should be designed according to the high speed flow rate of the unit. In order to keep the noise and pressure drop to a minimum, a maximum air velocity of 1100 ft/min [5.6 m/sec] should be used in calculations in duct design. The duct runs should be kept as short as possible with the minimum amount of elbows and transitions. The manufacturer recommends the use of smooth radius elbows or square elbows with turning vanes to achieve maximum performance.

Drains

The drain fittings provided with the unit will accept a 3/4" [19mm] NPT coupler (supplied by others). The drain line for the unit must be fabricated on-site and connected to the building main. A loop in the hose or trap in the copper or plastic pipe must be provided to prevent sewer gases from entering the unit when connecting to a drain as illustrated in Appendix D.

NOTE: Consult local building code for plumbing requirements in your area. If copper pipe is to be used, ensure not to solder to the 3/4" [19mm] coupler while it is attached to the plastic drain fitting as deformation may occur. Ensure adequate slope is present to allow good drainage (minimum 1/4"/foot or 6mm/305mm).

Electrical Connections

Power

A terminal block and strain relief bushing or a junction box is provided for line voltage to make the necessary power connections.

The electrical requirements are as follows:

	600 cfm	700 cfm	1150 cfm
VOLTAGE	120V	120V	120V
MCA	8.6	5.6	13.3
MOP	12	8	15

Control Box Access For Low Speed Setting
(600 cfm/1150 cfm only)

Disconnect power to the unit. Remove the four screws securing the cover plate as shown in Appendix F. Lift off the control cover plate and switch the red wire as shown in Appendix F.

Controls

General Information

Fan Interlock Switch *(FF)*

External fan control can be achieved by connecting an external fan source (G) through dry contacts (FF). These contacts are closed on a call for ventilation or frost control.

Speed Selection *(600 cfm/1150 cfm only)*

There are three speed settings available with the controls, only two of which can be functional at any one time. The units are factory set to use the low and high speed taps on the blower motors. If necessary, the medium speed tap can be used instead of the low speed tap. See Appendix F for instructions on how to make this change. Units without the remote wall control option can be shut off by opening the contact between LOW - COM or HIGH - COM as shown in Appendix E-2.

Sequence of Operation

Before start-up, check the unit for obstructive packaging, objects near or in blowers, dampers, heat exchangers, etc. Once installation is complete, check all modes of operation to ensure that the unit is working properly. Close the doors and check for operation on LOW, COM and HIGH. Use a wall control or the dry contact switching to run fan speeds as shown in Appendix E-2.

The 700 cfm unit is two speed. Low speed can be initiated by creating a closure across LOW - COM or high speed can be initiated by creating a closure across HIGH - COM.

Unit Check Points:

___ Power connected, no ventilation call - Both fans are off, frost control damper (if equipped) closes off fresh air from outside.

___ Power connected, low speed call - Both fans on low speed, internal frost control damper (if equipped) opens fresh air from outside. If equipped with recirculation module, the internal frost control damper closes recirculation opening.

___ Power connected, high speed call - Both fans on high speed, frost control damper opens fresh air from outside. If equipped with recirculation module, the internal frost control damper closes recirculation opening.

___ Power connected, occupied timer/sensor connection open (unoccupied mode) - Both fans are off, frost control damper closes fresh air from outside. If equipped with recirculation module, the internal frost control damper opens recirculation opening.

___ Power connected, FF control contacts close during unit ventilation or frost control cycle.

Frost Control

The unit functions are controlled by integrated controls in the unit which may include Exhaust Only Defrost or Recirculation Defrost (via the recirculation module - 600 cfm and 1200 cfm units only). In cold temperatures, frost control cycles will remove frost from the heat exchanger to maintain good operation.

Exhaust Only Defrost *(Optional)*

Frost removal occurs when the supply blower de-energizes, the supply air damper and the heat exchange damper close and the exhaust fan continues to circulate only warm inside air through the flat plate heat exchanger to maintain ventilation. This process prevents the build up of ice in the heat exchanger. Frost control is temperature initiated at 23°F to -22°F [-5°C to -30°C] and time based.

WARNING

A negative building pressure may develop during the frost control cycle with possible backdrafting fumes from combustion equipment.

Recirculation Defrost Module

The Recirculation Defrost Module is only available with the 600 cfm and 1150 cfm units. The frost control cycle is electronically controlled in response to the outside temperature 23°F to -22°F [-5°C to -30°C]. On a call for frost control, the supply air damper in the recirculation module closes, exhaust fan is de-energized and the supply fan continues to recirculate warm air through the flat plate heat exchanger. It is possible to extend the frost control times during very cold weather by removing the jumper JU1-F on the circuit board. For dimension and weight changes to the 600 cfm and 1150 cfm models with the recirculation defrost module, see Appendix B-2 and B-4.

Remote Wall Control *(Optional)*

Remote mounted wall control options are solid state controls that can be used to control the ventilators from a remote location. The connection from the ventilator to the control is low voltage and requires a 4 conductor (24 gauge minimum) LVT cable. Models are available with a dehumidistat control and speed switching. The following three options are available:

Standard Wall Control

Dehumidistat to engage high speed exchange. Slide switch operation supporting continuous low exchange and continuous high exchange.

Xtra Wall Control

Dehumidistat to engage high speed exchange. Electronic push button operation supporting intermittent (stand-by) ventilation, continuous low exchange, continuous high exchange, maintenance indicator light and exchange indicator light.

AquaAir Wall Control

Ideal for pool dehumidification. Dehumidistat to engage high speed exchange. Electronic push button operation supporting intermittent (stand-by) ventilation, continuous low exchange, continuous high exchange, maintenance indicator light and exchange indicator light.

Airflow Measurement and Balancing

Once installation is complete, the supply and exhaust airflows should be balanced to ensure proper operation and a good quality installation. A well designed duct system with properly sized duct runs and equal static pressure losses of both the supply and exhaust will aid in balancing the unit. However, it will be necessary to take flow measurements with the proper equipment to ensure a balanced system. Magnehelic gauges and Flow Measuring Stations (FMS) are available for 14" x 8" [356 x 203mm] or 20" x 8" [508 x 203mm] rectangular duct and a range of round duct sizes. Please ask your supplier for more information.

Flow Station Positions

Whether flow stations are permanently installed or used temporarily, the position they are placed in is very important to ensure accuracy as shown in Appendix C. The best locations for mounting the FMS is in the long straight sections of ducting where airflow has stabilized across the area of the duct. This position will provide the most accurate measurements.

The next best location for the FMS is immediately before or after a 90 degree elbow and 12" [305mm] from any damper. In straight sections of pipe, the FMS should be installed at least 30" [762mm] from any fan outlet. This applies to the "Supply Air Opening" connection on the heat recovery ventilator and the "Exhaust Air Opening" connection.

With airflow measuring stations permanently installed, balancing is done by measuring airflow on one side of the heat recovery ventilator and then the other. Adjustments can then be made to the damper to equalize airflows.

When using the temporary method, an FMS is installed in one air duct of the heat recovery ventilator and the flow recorded. The FMS is then relocated to the other air duct and the airflow is recorded again. Dampers can then be adjusted to equalize airflow. This procedure should be repeated to ensure that the unit is balanced properly.

Balancing Procedure

Before proceeding with balancing, all windows, overhead doors and walk-in doors should be closed and exhaust systems should be turned off.

The connections between the flow stations and the ducts must be sealed with tape. Mount the magnehelic gauge in a convenient location where it is level and will not vibrate or be bumped. Zero the gauge. Measure the exhaust air first as it is often the lowest due to a longer duct system.

With the fan speed at maximum, connect the hoses from the FMS to the magnehelic gauge. If the needle falls below zero, reverse the hose connections. Ensure that the damper is wide open. Take a reading from the magnehelic gauge and record it. Remove the FMS and place it in the supply duct. This process is not necessary if the FMS is to be permanently mounted.

Repeat the procedure. If the reading is higher in the supply duct, adjust the damper until the reading is the same. If the reading is lower, return the FMS to the exhaust duct and adjust the damper to obtain the same reading as the supply duct.

System Service

Bi-Monthly Maintenance

WARNING
Disconnect power before maintaining the unit.

Bi-monthly maintenance should include:

Air Filters

The standard foam filters are washable. Under normal conditions it is recommended that they be cleaned every two months. More frequent cleaning may be required under extremely dirty operating conditions. Use a vacuum cleaner to remove the heaviest portion of accumulated dirt, then wash with warm water.

A medium efficiency filter for the supply airstream is available from your supplier. This filter is disposable and should be replaced when it becomes dirty.

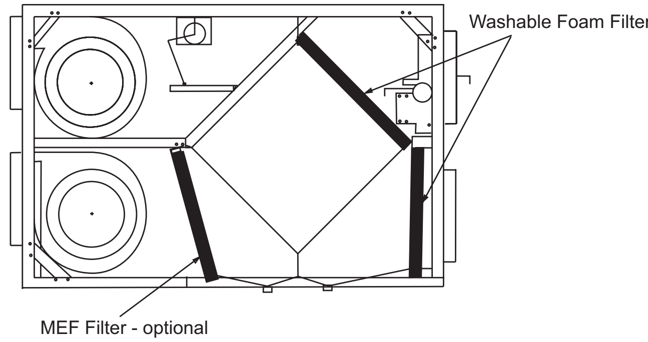


Figure 1: 600 cfm and 1150 cfm

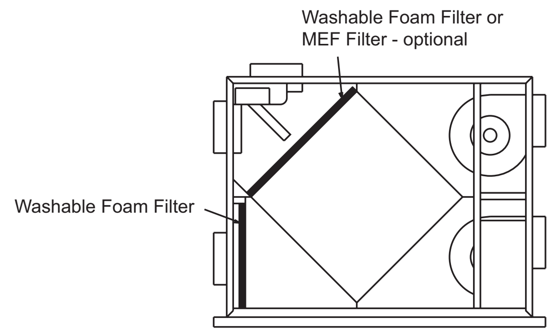


Figure 2: 700 cfm

Drain Pans and Interior of Unit

With the filters removed from the unit, the foil faced insulation surfaces and drain pans should be wiped clean with a soft cloth and mild cleaning solution. Ensure that the drain fittings are free from dirt and draining freely.

Annual Maintenance

WARNING
Disconnect power before maintaining the unit.

Annual maintenance should include:

Air Filters

Vacuum and wash standard foam filters. Replace medium efficiency filter if present.

Drain Pans and Interior of Unit

Wash the foil faced insulation surfaces and wipe the drain pans with a soft cloth and mild cleaning solution. Check the drain fittings to ensure they are draining freely.

Flat Plate Heat Exchanger

The flat plate heat exchanger must be handled with care. In order to ensure maximum efficiency of the partitions, it is recommended that it be washed once a year following the season of most intense use. Allow the flat plate heat exchanger to soak for three hours in warm water and mild soap. Rinse under a heavy stream of water. When replacing the flat plate heat exchanger sections, make sure the flutes on the heat exchanger are positioned in the supply airstream. Failure to do so will result in low airflow on the exhaust airstream due to system pressure trapping or holding condensate in the flutes.

Fans

WARNING

Hot water and strong cleaning agents could damage the polypropylene heat exchanger. Ensure the heat exchanger is returned to the unit in the correct orientation. Use the sticker as a guide.

Blower wheels and fan housing should be checked for dirt build-up. If they appear dirty, it may be necessary to remove the blower assembly and then vacuum the dust out through the fan mouth. See figures 3 and 4 for instructions on removing the blower assembly.

System Operation Check

Verification of all control modes should be checked to ensure proper operation. Refer to the Controls Section, Sequence of Operation.

Testing and Replacement of the Damper Actuator

Check damper operation by switching between LOW - COM or HIGH - COM on the dry contact terminal or by switching through the modes on the optional remote wall control. If the damper does not respond in one or both directions, check all connections.

700 cfm ONLY: Check for 24 volt output between the White/Red and the White/Orange wires at the damper motor. If 24 volts can be measured at the damper motor, the problem is either in the connections, the frost control relay or the main circuit board.

600/1150 cfm ONLY: (**CAUTION:** 120 VAC) With the unit powered but off, check for 120 volt output across the white/black wires. If 120 volt can be measured at the motor, replace the motor. If 120 volt cannot be measured at the motor, check for 120 volts across pins J1-9 and J1-1 at the printed circuit board.

Main Circuit Board Replacement

The main circuit board must be replaced if an electronic problem arises. For example, the unit suddenly stops, the unit stays in frost control mode all the time or if control functions are not working properly.

Ensure that power is reaching the board. Test the blower motors and damper actuators for operation when directly connected to the appropriate power voltage. If the motor and damper actuators function normally, replace the main circuit board.

Motor and Blower Removal and Installation

Disconnect power from the unit. To determine if the fan motor is burned out, disconnect the four-wire service connector between the motor and cabinet. Connect the motor directly to a 120 volt power source with an electrical cable as follows:

RED + WHITE	Low speed
BLUE + WHITE	Medium speed
BLACK + WHITE	High speed

If the motor functions normally, there is a problem with the wiring connections or the main circuit board. Check all wiring and replace main circuit board if necessary.

If the blower does not run, it must be replaced. To replace the motor, remove the flat plate heat exchanger from the unit. Disconnect the four-wire service connector from the unit. Remove the fasteners holding the motor assembly in place. Lift the assembly up and out, using one hand under the motor and one hand to steady it. Remove the assembly carefully from the unit to avoid damage to the insulation, shelf, etc. Install the repaired motor assembly by following these instructions in reverse.

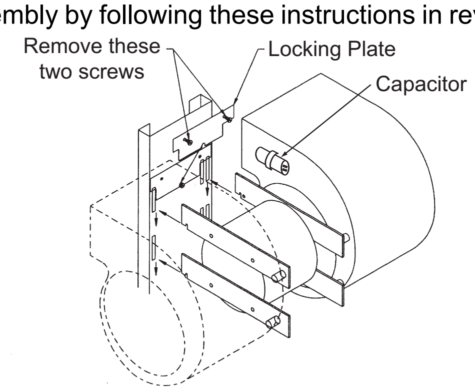


Figure 3: Blower Assembly Removal 600 cfm and 1150 cfm

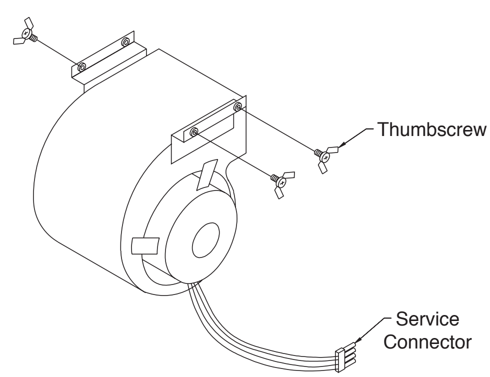
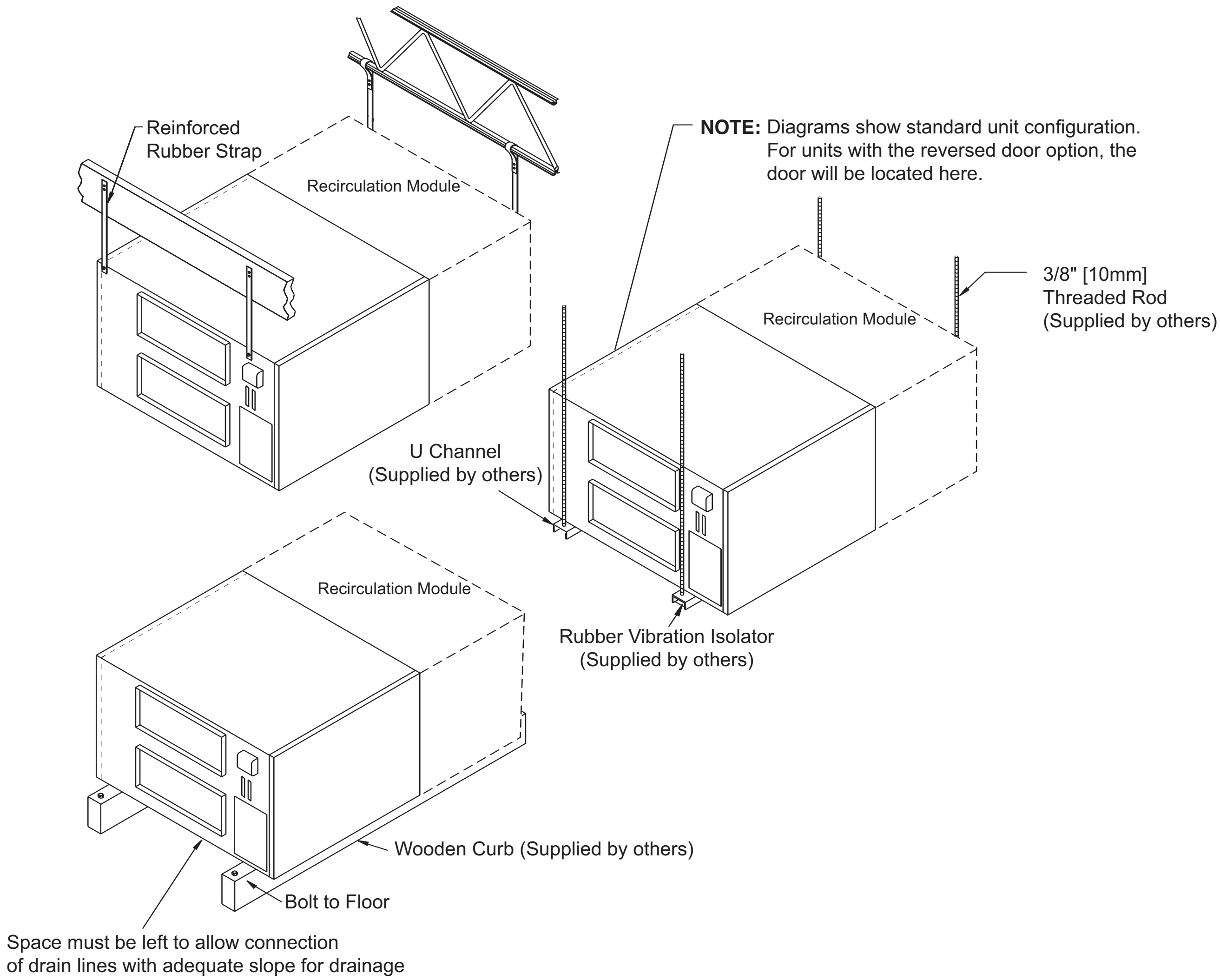


Figure 4: Blower Assembly Removal 700 cfm

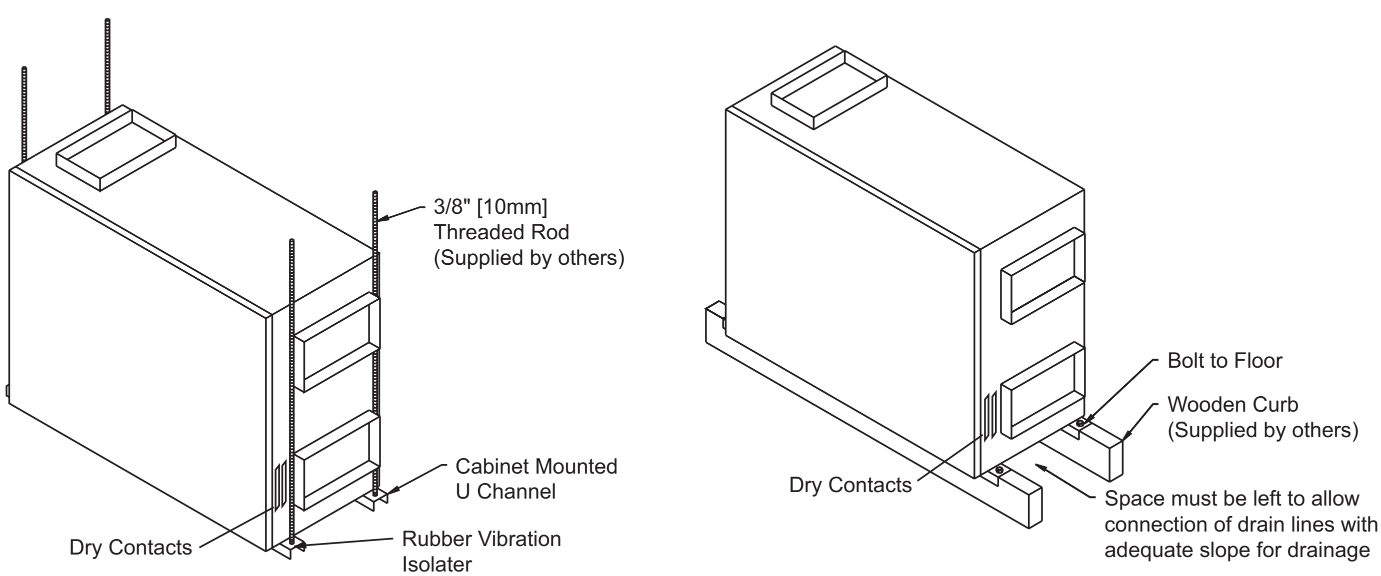
Appendix A

Mounting Diagrams

600 cfm and 1150 cfm



700 cfm



Appendix B

Unit Dimensions

B-1: 600 cfm (without recirculation module)

NOTES:

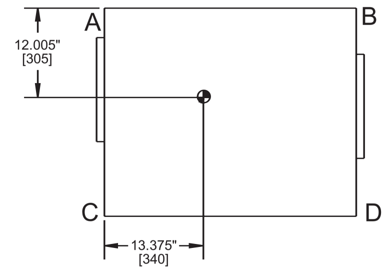
Dimensions in [ ] are millimeters

Center of gravity

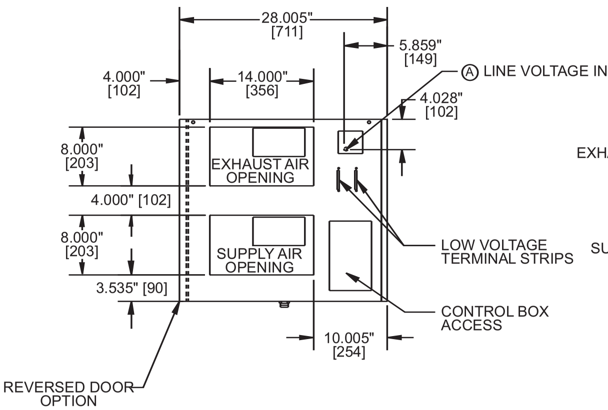
Direction of airflow

HRV600i POLY CORE			HRV600i ALUMINUM CORE		
PTS	LBS	Kg	PTS	LBS	Kg
A	38.49	17.45	A	44.21	20.00
B	24.96	11.32	B	28.67	13.00
C	51.29	23.26	C	58.92	26.72
D	33.26	15.08	D	38.21	17.30
TOTAL	148.00	67.13	TOTAL	170.00	77.11

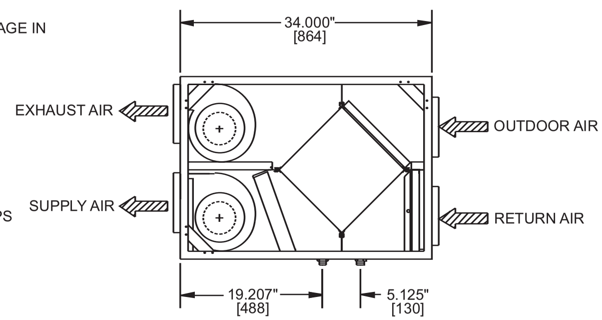
CONNECTION TABLE		
		CONNECTION SIZES
A	Line voltage in	14 gauge wire nut
B	Condensate drain fitting (2x)	3/4" mpt



TOP VIEW

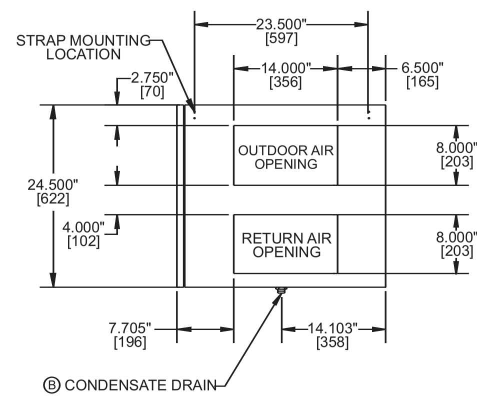


LEFT SIDE VIEW



NOTE: For units with the reversed door option, interior components will appear as a mirror image of the above diagram.

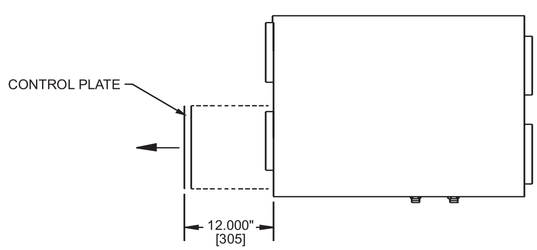
FRONT VIEW



RIGHT SIDE VIEW

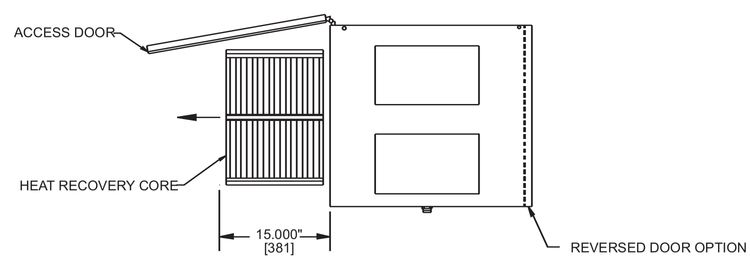
NOTE: This model has a damper located on the outdoor intake connection. This damper will close during a frost control cycle or when the unit is placed in the 'OFF' position with power maintained to the unit. This damper is not designed as a backdraft damper and will remain open if power is disconnected from the unit for any reason.

NOTE: A minimum of 12.000" [305] clearance from any obstruction is required for removal of the control box.



FRONT VIEW

NOTE: A minimum of 15.000" [381] clearance from any obstruction is required for removal of heat recovery cores, fans, etc. The access door can be removed from the cabinet with only 2.000" [51] of clearance.



RIGHT SIDE VIEW

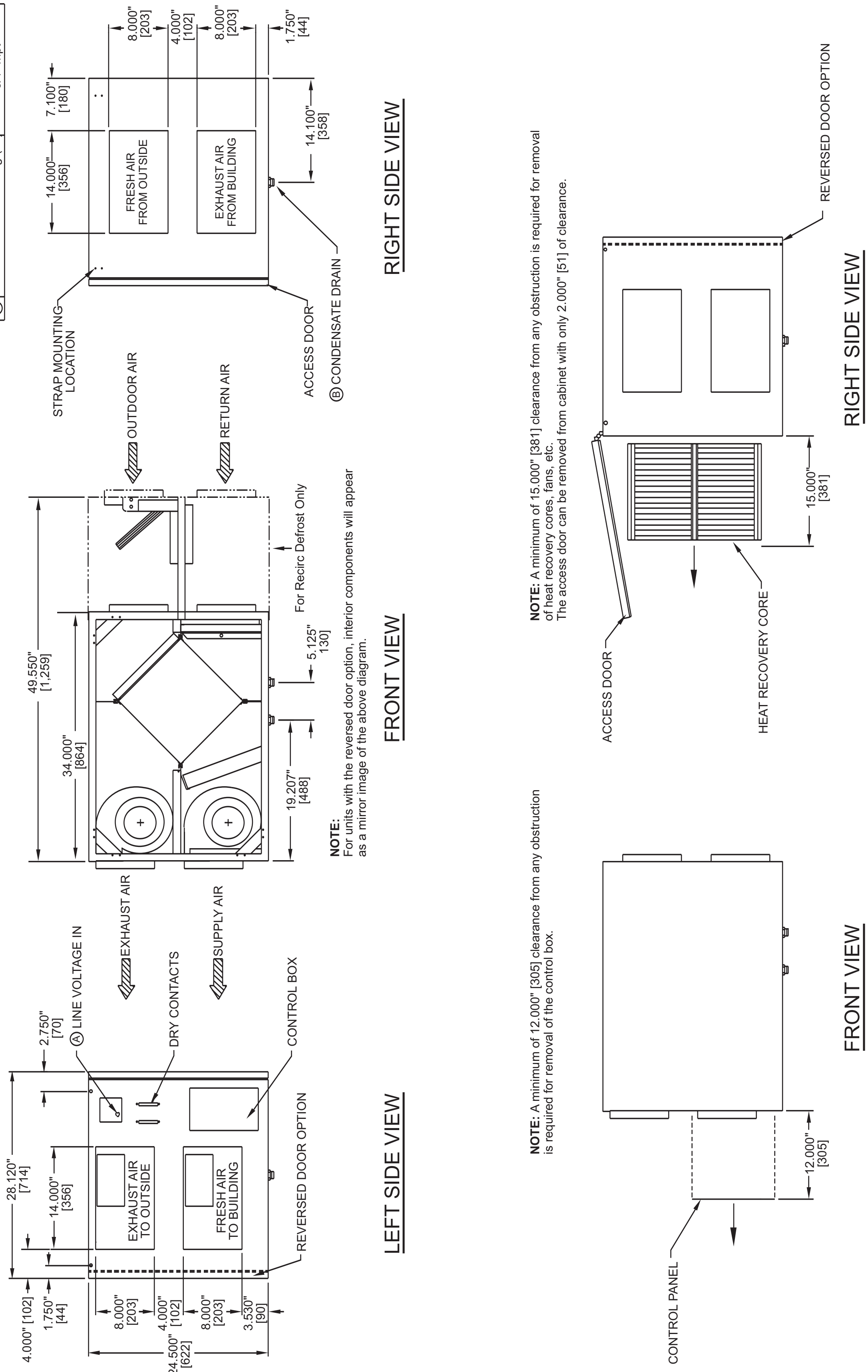
Unit Dimensions

B-2: 600 cfm with recirculation module

NOTE: Dimensions in [ ] are millimeters

HRV600i POLY CORE with recirculation module	HRV600i ALUMINUM CORE with recirculation module
197 LBS (90 kg)	231 LBS (105 kg)

CONNECTION TABLE	
	CONNECTION SIZES
Ⓐ Line voltage in	14 gauge wire nut
Ⓑ Condensate drain fitting (2x)	3/4" mpt



Unit Dimensions

B-3: 1150 cfm (without recirculation module)

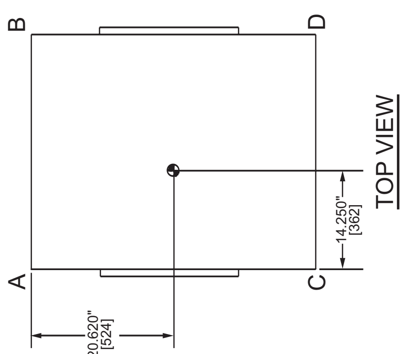
NOTES:

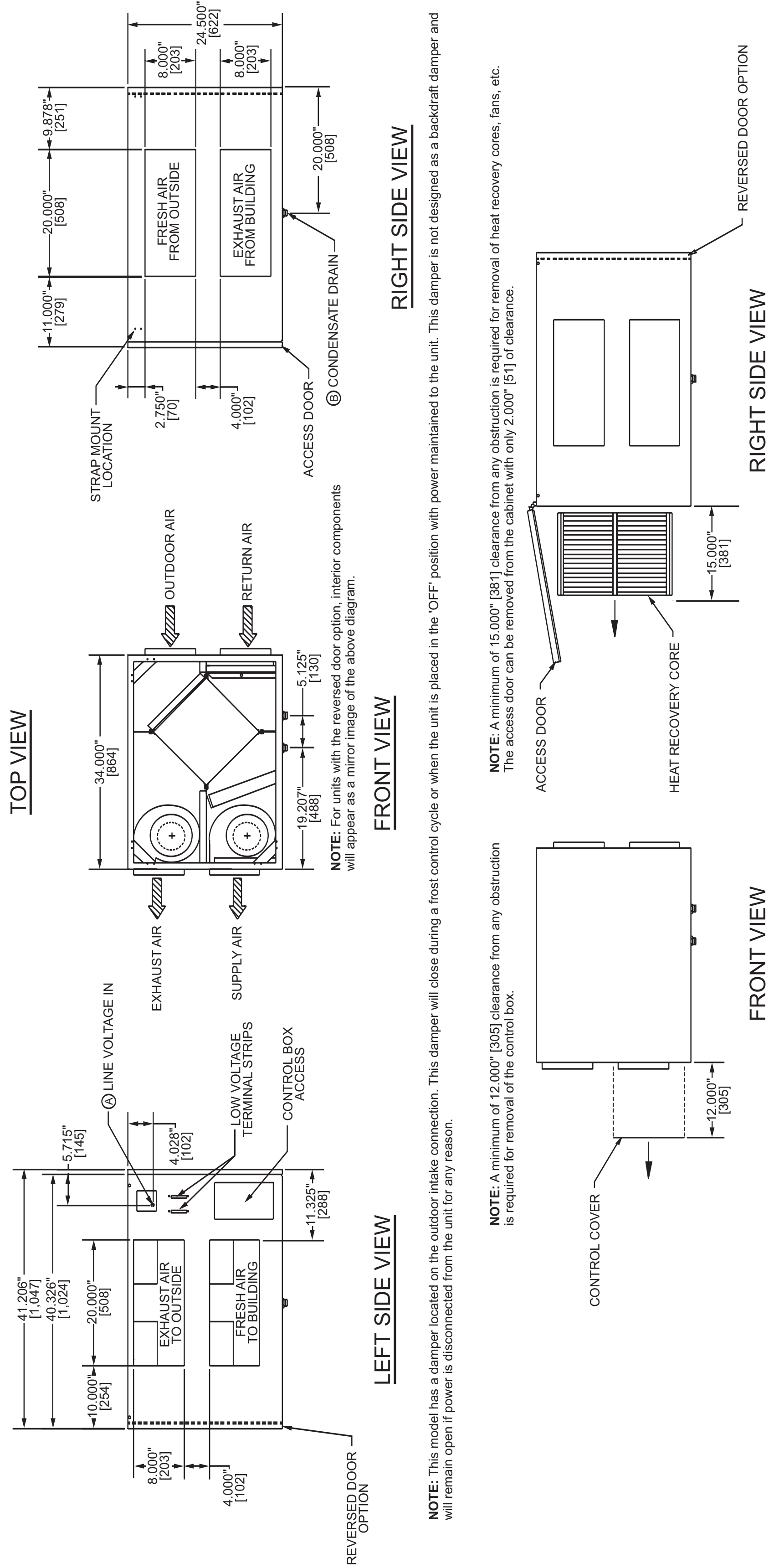
Dimensions in [ ] are millimeters
Center of gravity
Direction of airflow

HRV1200i POLY CORE			HRV1200i ALUMINUM CORE		
PTS	LBS	Kg	PTS	LBS	Kg
A	54.02	24.50	A	60.41	27.40
B	38.98	17.68	B	43.59	19.77
C	54.02	24.50	C	60.41	27.40
D	38.98	17.68	D	43.59	19.77
TOTAL	186.00	84.36	TOTAL	208.00	94.34

CONNECTION TABLE

		CONNECTION SIZES
A	Line voltage in	14 gauge wire nut
B	Condensate drain fitting (2x)	3/4" mpt





NOTE: For units with the reversed door option, interior components will appear as a mirror image of the above diagram.

NOTE: This model has a damper located on the outdoor intake connection. This damper will close during a frost control cycle or when the unit is placed in the 'OFF' position with power maintained to the unit. This damper is not designed as a backdraft damper and will remain open if power is disconnected from the unit for any reason.

NOTE: A minimum of 15.000" [381] clearance from any obstruction is required for removal of heat recovery cores, fans, etc. The access door can be removed from the cabinet with only 2.000" [51] of clearance.

NOTE: A minimum of 12.000" [305] clearance from any obstruction is required for removal of the control box.

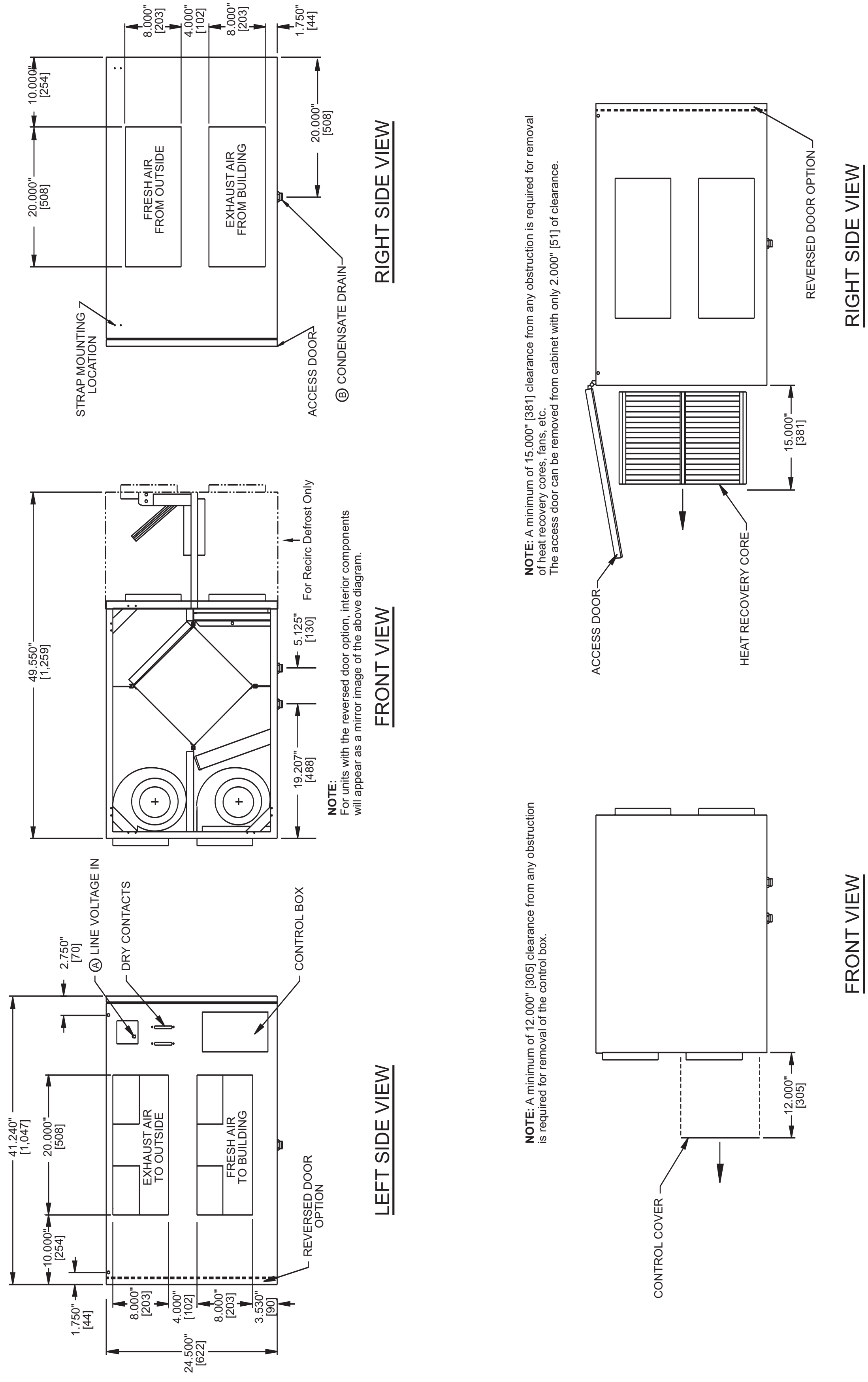
Unit Dimensions

B-4: 1150 cfm with recirculation module

NOTE: Dimensions in [ ] are millimeters

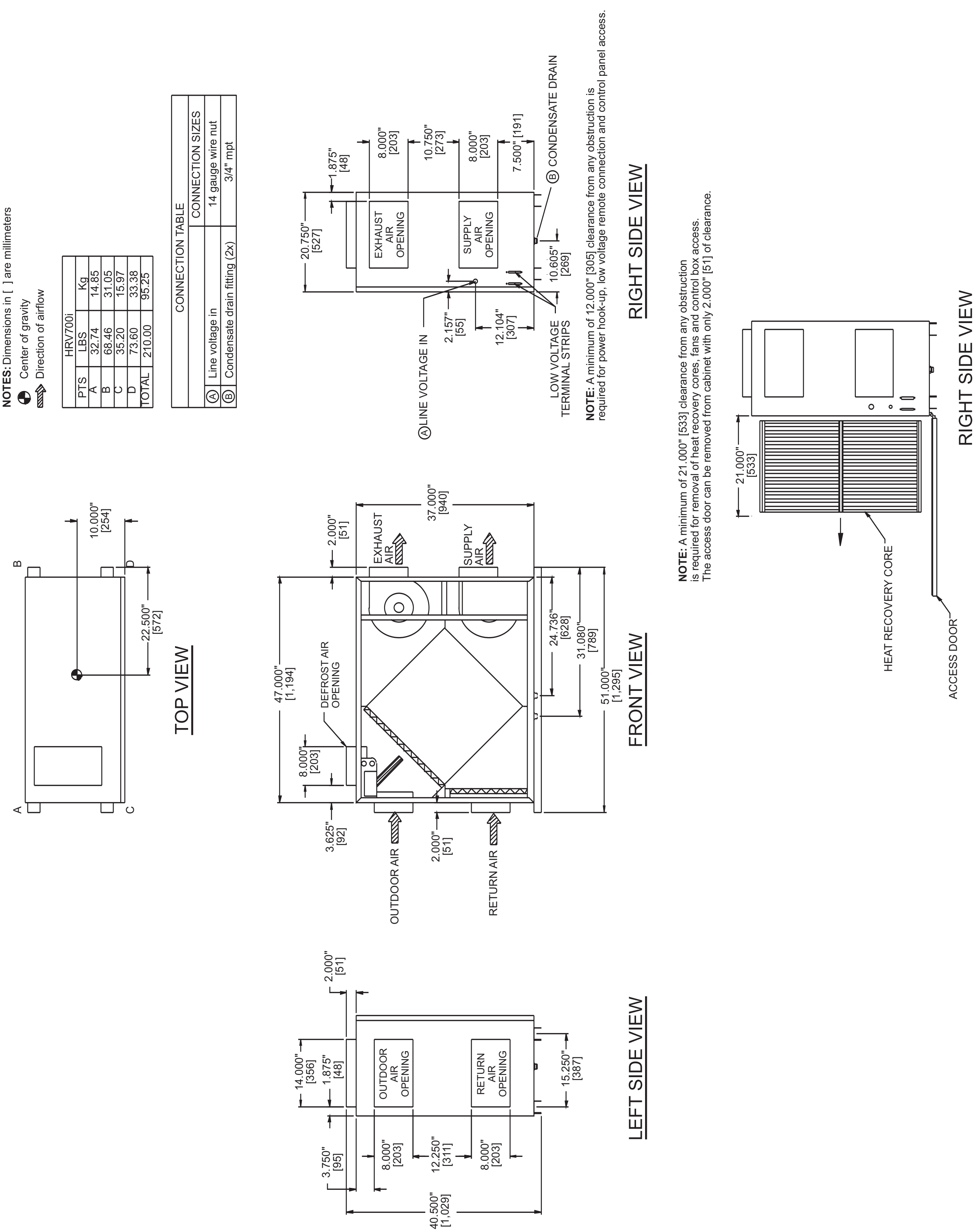
HRV1200i POLY CORE with recirculation module	HRV1200i ALUMINUM CORE with recirculation module
247 LBS (112 kg)	269 LBS (122 kg)

CONNECTION TABLE	CONNECTION SIZES
(A) Line voltage in	14 gauge wire nut
(B) Condensate drain fitting (2x)	3/4" mpt



Unit Dimensions

B-5: 700 cfm



NOTES: Dimensions in [ ] are millimeters
Center of gravity
Direction of airflow

PTS	HRV700i LBS	Kg
A	32.74	14.85
B	68.46	31.05
C	35.20	15.97
D	73.60	33.38
TOTAL	210.00	95.25

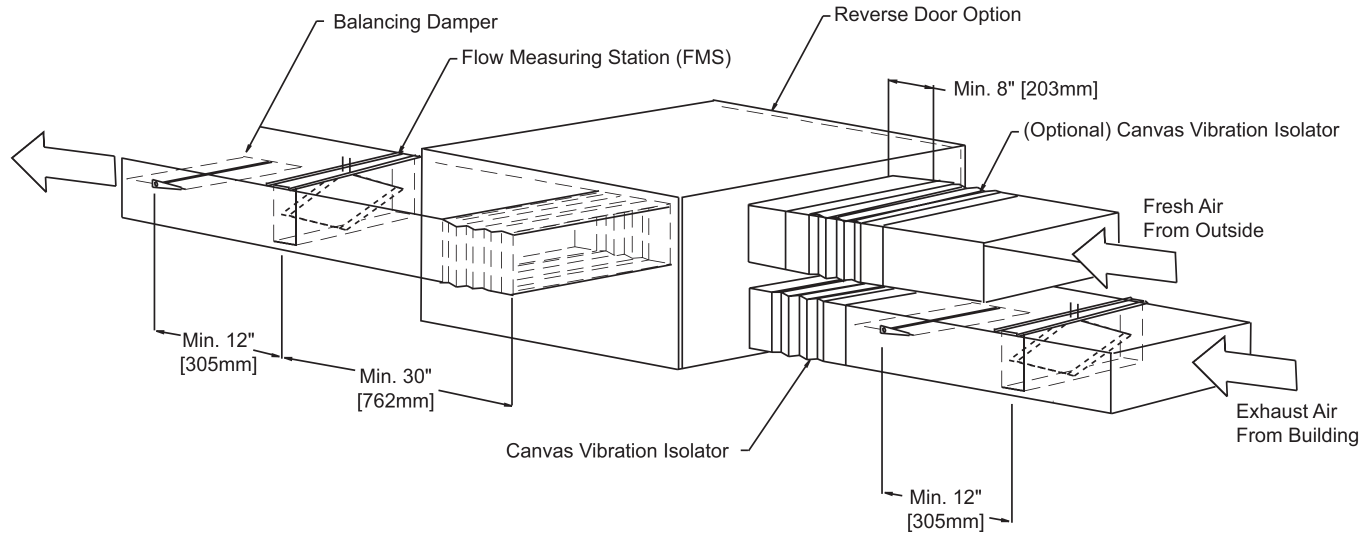
CONNECTION TABLE	CONNECTION SIZES
(A) Line voltage in	14 gauge wire nut
(B) Condensate drain fitting (2x)	3/4" mpt

NOTE: A minimum of 12.000" [305] clearance from any obstruction is required for power hook-up, low voltage remote connection and control panel access.

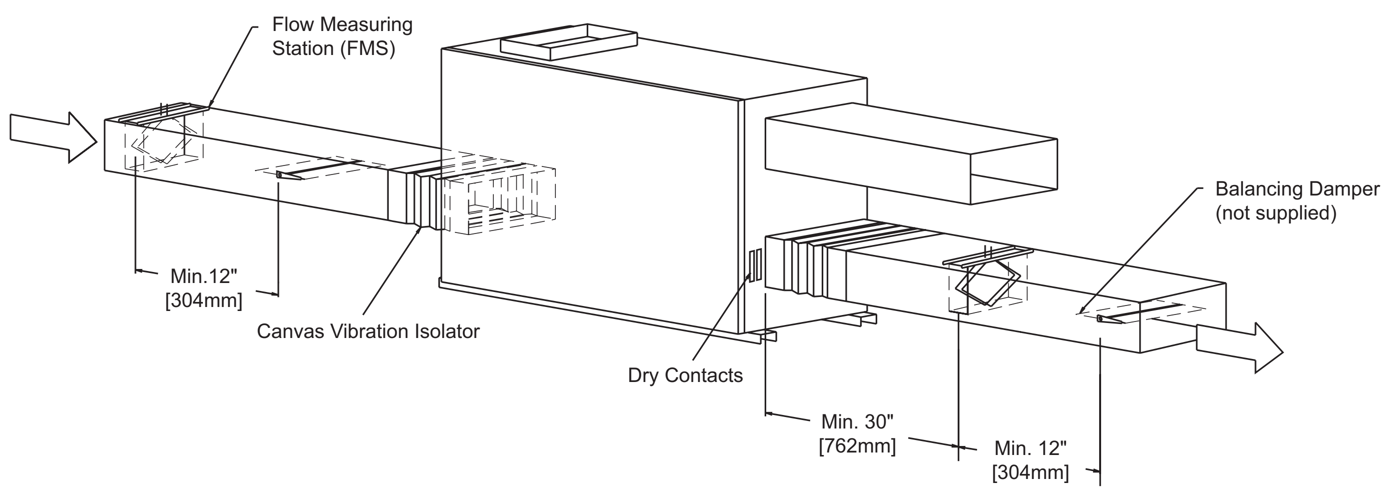
NOTE: A minimum of 21.000" [533] clearance from any obstruction is required for removal of heat recovery cores, fans and control box access. The access door can be removed from cabinet with only 2.000" [51] of clearance.

Flow Station Positions

600 cfm and 1150 cfm

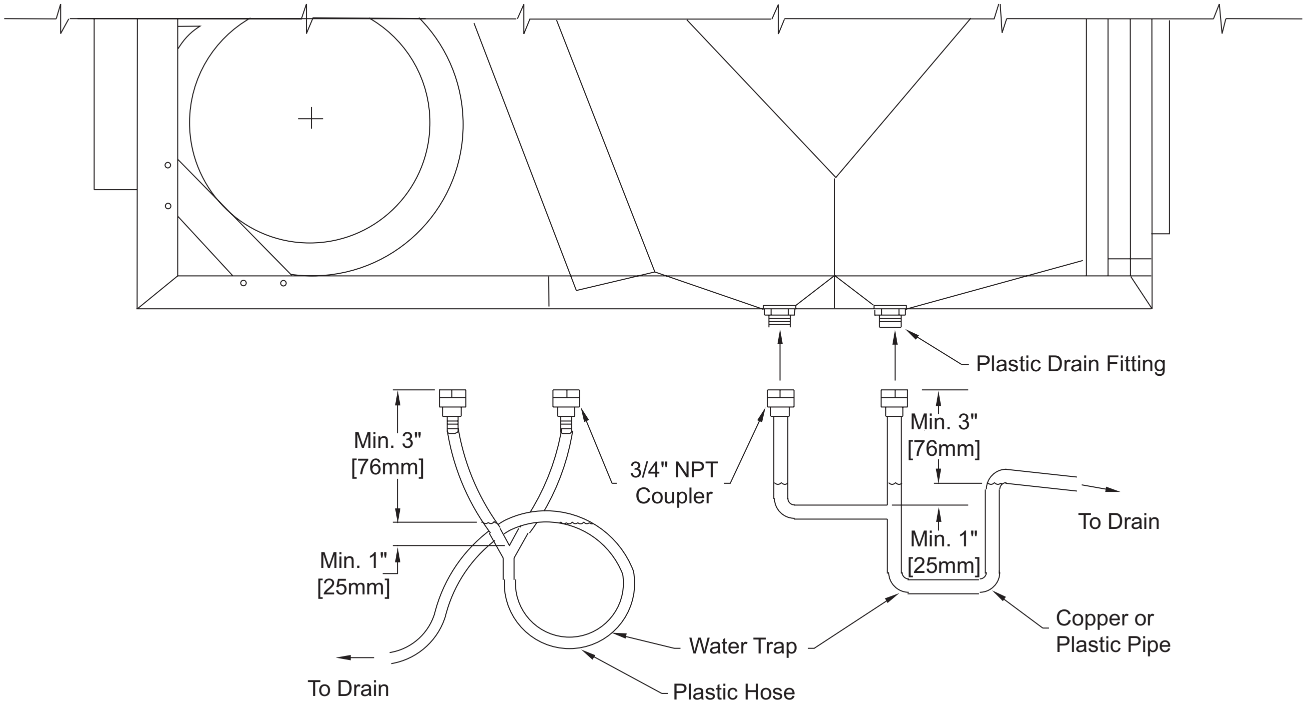


700 cfm



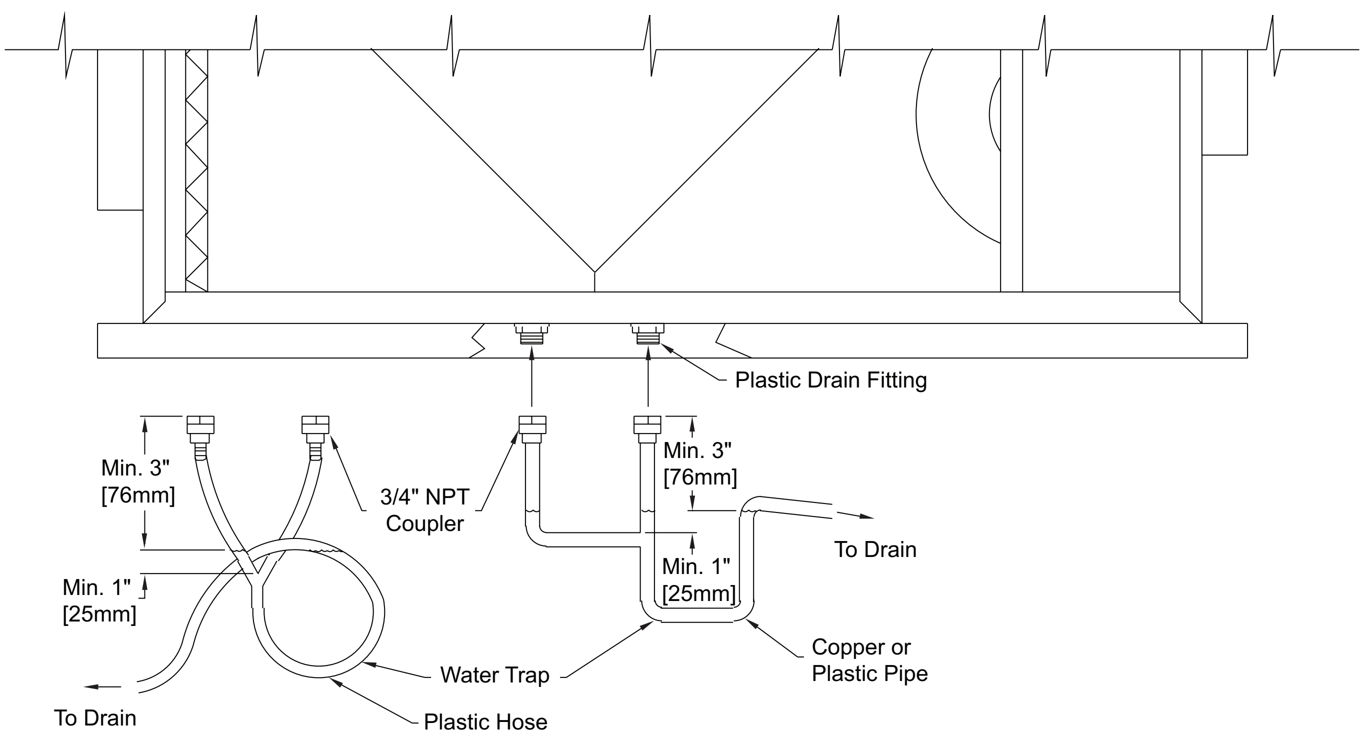
Drain Connections

600 cfm and 1150 cfm



NOTE: All hose, pipe and couplers to be supplied by others.

700 cfm



NOTE: All hose, pipe and couplers to be supplied by others.

Terminal Control Diagrams

E-1: Terminal Label

A low voltage remote control wiring interface is provided on the unit. The connections for the low voltage remote wiring are located on two terminals adjacent to the exhaust fan outlet (or adjacent to the supply fan outlet on the 700 cfm unit). All field installed wiring must be low voltage class II.

Remote Wall Control
Optional wall control requires a 4-wire LVT 24 gauge (or equivalent). This remote wall control runs on 12 VDC.

Low Voltage Controls
All other terminals are dry contacts.

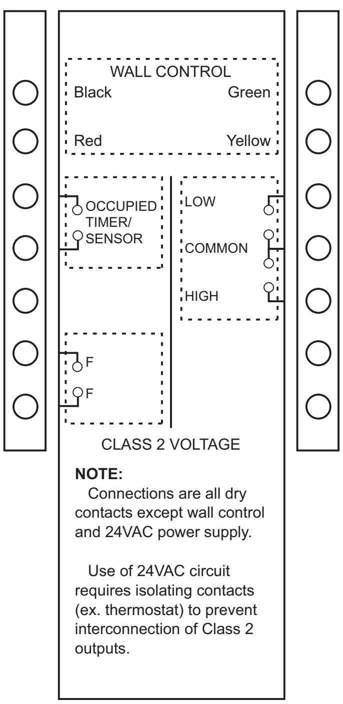
Low voltage terminal control consists of the following:

Wall Control
4-wire LVT 24 gauge minimum.

Occupied (Night Setback) Timer/Sensor
24 VAC, needs dry contact.

LOW - COM - HIGH
Remote fan switching requires a single pole, double throw switch (SPDT).

Fan Interlock switch (FF)
Dry contact closes on ventilation or frost control. Used to control external fan source (G).



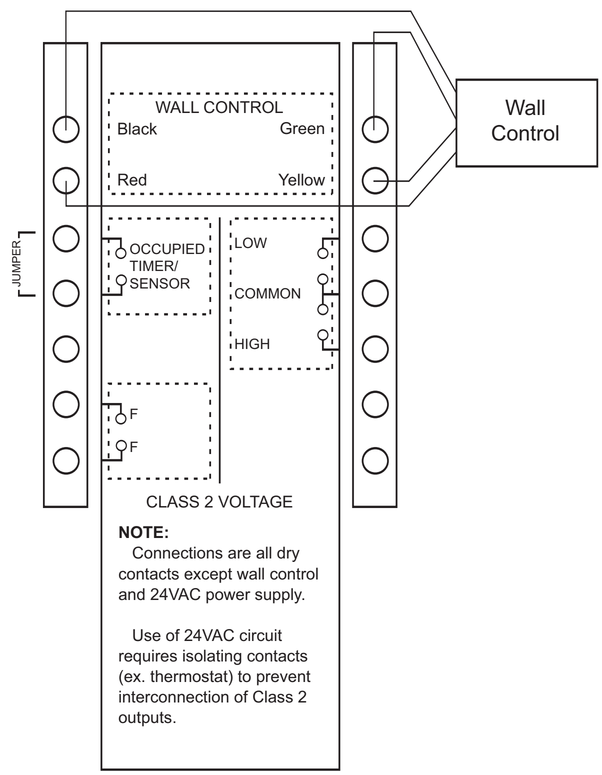
E-2: Wall Control Connection

Three types of remote wall controls are available:

1. **Standard Wall Control** with fan switch and dehumidistat control.
2. **Xtra Wall Control** with fan mode selection, dehumidistat control and maintenance indicator.
3. **AquaAir Wall Control** with fan mode selection, dehumidistat control and high speed recirculation mode.

The remote wall controls work with the integrated electronic controls within the unit to control ventilation sequences. Each wall control has different features and requires 4-wire connection to the unit as shown below. Without the wall control, fans can be operated with a remote fan switch as shown in Appendix E-4.

NOTE: An occupied timer or sensor device **cannot be used** with the Xtra wall control.



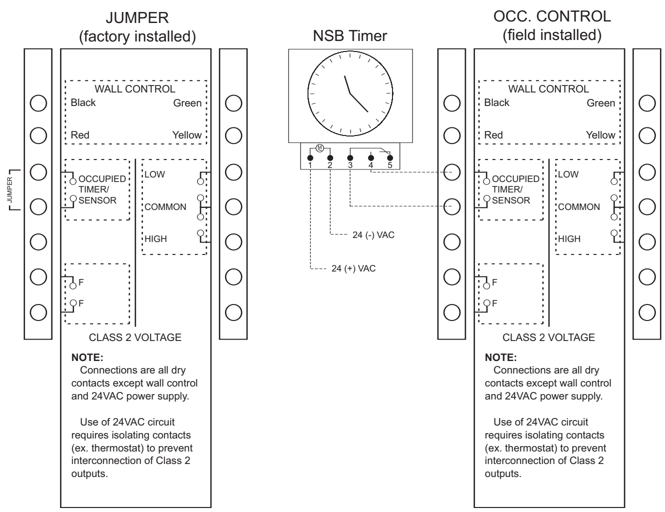
Terminal Control Diagrams

E-3: Occupied Timer/Sensor Connection

Occupancy control is achieved by connection to the terminal interface shown below. These terminals require a dry contact which could be provided by a number of types of controls such as a timer, light sensor, occupancy sensor, building management system or other. **The unit will not operate unless these contacts are closed!!**

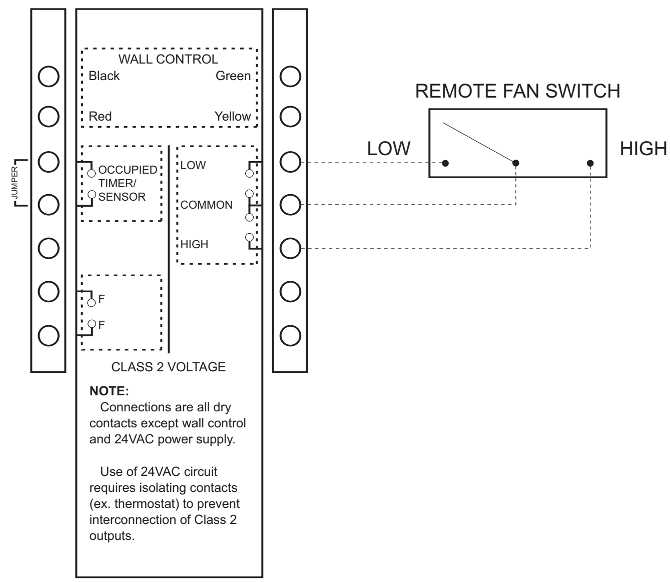
The illustration below shows a factory installed jumper and programmable timer option.

NOTE: An occupied timer or sensor device **cannot be used** with the Xtra wall control.



E-4: Remote Fan Control

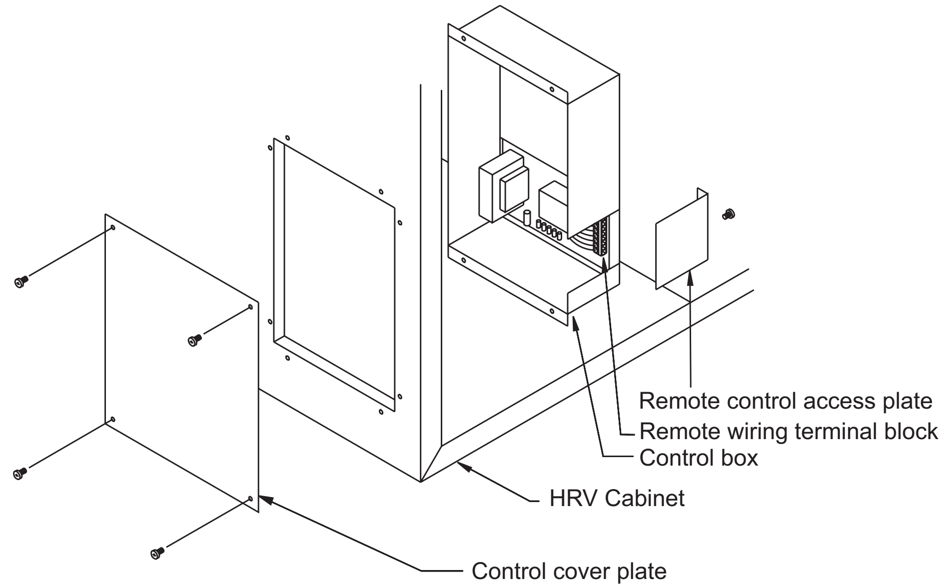
Remote fan control can be achieved by connecting dry contact controls to the terminal interface at terminals labeled: LOW - COM - HIGH. These controls could be the following: SPDT switch, dehumidistat, CO_2 sensor, light sensor, timer, building management system, etc. The illustration below represents a switch connected to the unit.



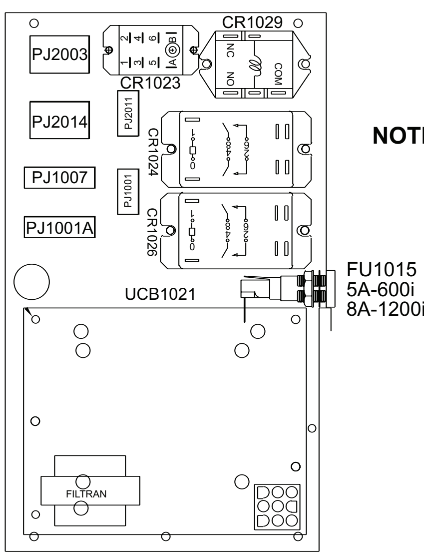
Appendix F

Electrical Connection Diagrams

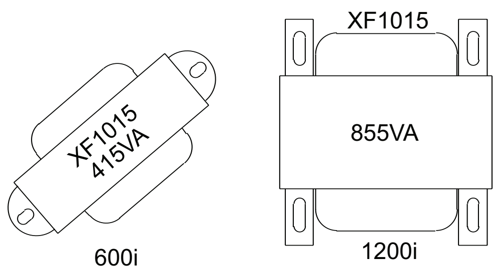
Control Box Assembly 600 cfm and 1150 cfm



Low Speed Setting Wire Connections 600 cfm and 1150 cfm



NOTE: Low speed motor selection may be replaced by medium speed. To make this change, replace the low speed wires (red) on relay CR1024 with the medium speed wires (blue).



NOTE: Autotransformers (if equipped) are mounted on the back of the control box.

Appendix G

Make-up Heat Requirements

Although the 600 cfm, 700 cfm and 1150 cfm models have good efficiencies, the supply air could be colder than the ambient room air. It is possible to eliminate the discomfort associated with this temperature difference by installing an electric duct heater. This will temper the air before it is distributed throughout the building. The table below gives the heating requirements at different temperatures and airflows.

NOTE: The data does not reflect a reduction in effectiveness due to frosting. Based on the standard air at: 1.2 Kg/m3 and Cp = 1.0 KJ/Kg°C 13.35 lb/ft3 and Cp = .24 Btu/lbm°F

600 cfm and 700 cfm

600 and 700 CFM UNIT		OUTDOOR AIR -40°F [-40°C]			OUTDOOR AIR -22°F [-30°C]			OUTDOOR AIR -4°F [-20°C]			OUTDOOR AIR 14°F [-10°C]			OUTDOOR AIR 32°F [0°C]		
		Desired Air Temperature			Desired Air Temperature			Desired Air Temperature			Desired Air Temperature			Desired Air Temperature		
Supply Air	Supply Air	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]
(cfm)	(L/s)	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
700	330	7.4	10.4	11.5	5.6	8.6	9.7	3.9	6.8	8.0	2.1	5.1	6.2	0.3	3.3	4.4
650	307	6.6	9.4	10.5	5.0	7.8	8.9	3.4	6.2	7.3	1.8	4.6	5.6	0.2	3.0	4.0
600	283	5.9	8.5	9.4	4.5	7.0	8.0	3.0	5.6	6.5	1.6	4.1	5.1	0.1	2.7	3.7
550	259	5.2	7.6	8.5	3.9	6.3	7.2	2.6	5.0	5.9	1.3	3.7	4.6	0.1	2.4	3.3
500	236	4.0	6.1	7.0	3.0	5.1	5.9	1.9	4.0	4.9	0.9	3.0	3.8	-	1.9	2.7
450	212	3.0	4.9	5.6	2.1	4.0	4.8	1.3	3.2	3.9	0.4	2.3	3.1	-	1.5	2.2
400	189	2.2	3.9	4.6	1.5	3.2	3.9	0.9	2.5	3.2	0.2	1.9	2.5	-	1.2	1.8

1150 cfm

1150 CFM UNIT		OUTDOOR AIR -40°F [-40°C]			OUTDOOR AIR -22°F [-30°C]			OUTDOOR AIR -4°F [-20°C]			OUTDOOR AIR 14°F [-10°C]			OUTDOOR AIR 32°F [0°C]		
		Desired Air Temperature			Desired Air Temperature			Desired Air Temperature			Desired Air Temperature			Desired Air Temperature		
Supply Air	Supply Air	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]	55°F[13°C]	68°F[20°C]	73°F[23°C]
(cfm)	(L/s)	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
1250	590	14.6	19.9	21.9	11.2	16.5	18.5	7.8	13.1	15.2	4.4	9.7	11.8	1.0	6.3	8.4
1200	566	13.5	18.6	20.6	10.4	15.5	17.4	7.2	12.3	14.3	4.0	9.1	11.1	0.8	5.9	7.9
1150	542	12.6	17.4	19.3	9.6	14.5	16.4	6.6	11.5	13.4	3.6	8.5	10.4	0.7	5.5	7.4
1100	675	11.2	15.9	17.7	8.5	13.2	15.0	5.8	10.5	12.3	3.1	7.7	9.6	0.4	5.0	6.8
1050	495	10.7	15.2	16.9	8.1	12.6	14.3	5.5	10.0	11.7	2.9	7.4	9.1	0.4	4.8	6.5
1000	472	9.9	14.1	15.7	7.4	11.7	13.3	5.0	9.3	10.9	2.6	6.9	8.5	0.2	4.4	6.1
900	425	8.5	12.4	13.8	6.4	10.2	11.7	4.3	8.1	9.6	2.2	6.0	7.5	0.1	3.9	5.4
800	377	7.0	10.4	11.7	5.2	8.6	9.9	3.4	6.8	8.2	1.7	5.0	6.4	-	3.3	4.6
700	330	5.1	8.1	9.3	3.7	6.7	7.9	2.3	5.3	6.5	0.9	3.9	5.1	-	2.5	3.7

Appendix H

Trouble Shooting

SYMPTOMS	POSSIBLE CAUSES	SOLUTIONS
Inside air is too dry.	Over ventilation - speed setting too high.	Adjust speed setting.
	Dehumidistat setting is too low.	Set dehumidistat control in a higher position (if applicable).
Persistent condensation on windows, walls, ceilings, etc.	Improper adjustment of dehumidistat control.	Adjust dehumidistat control knob to a lower setting.
	Improper ventilation rate.	Install a dehumidistat (option).
	Window frame is too cold or leaky.	Repair window frame.
Unit stops functioning.	Electrical supply interrupted.	Check the unit circuit breaker.
Air from supply diffusers too cold.	Imbalance of supply and exhaust air.	Check filters and heat exchangers for blockage. Check balance of airflows.
	Outdoor temperature very cold.	Install electric duct heater if necessary.
Unit makes annoying noise.	Blower wheel out of alignment.	Remove the motor/blower assembly and adjust blower wheel.
Heat exchanger freezing up.	Imbalance of supply and exhaust air.	Check filters and heat exchangers for blockage. Check balance of airflows.
	Frost control damper not functioning.	Check for operation of both frost control damper actuators.
Low exhaust airflow in winter season.	Heat exchanger flutes are positioned in the exhaust airstream.	Remove flat plate heat exchanger sections and re-position the flute side of the heat exchanger into the supply airstream.